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SOVIET MILITARY EMPHASIS ON FUEL RESUPPLY.(U)
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STUDENT RESEARCH REPORT

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SOVIET MILITARY EMPHASIS
ON FUEL RESUPPLY
1977

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SOVIET MILITARY EMPHASIS ON FUEL RESUPPLY •

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FOREWORD

This research project represents fulfillment of a student requirement for successful completion of the overseas phase of training of the Department of the Army's Foreign Area Officer Program (Russian).

Only unclassified sources are used in producing the research paper. The opinions, value judgments and conclusions expressed are those of the author and in no way reflect official policy of the United States Government; Department of Defense; Department of the Army; Office of the Assistant Chief of Staff of Intelligence; or the United States Army Institute for Advanced Russian and East European Studies.

Interested readers are invited to send their comments to the Commander of the Institute.


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SUMMARY

↓ In this paper the author presents Soviet views on the importance and methods of execution of supplying military units with fuel. It is the author's contention that from an analysis of Soviet military writings one can extract the importance given to a current doctrine. The author provides a general discussion of fuel resupply and then focuses on the supplying of fuel to battalion elements during the march, during offensive operations and in the defense. It is the author's intention to provide a clear picture of the current emphasis and present considerations by the Soviet Army concerning supplying its sub-units with fuel. The author concludes that at the present the Soviet military is emphasizing the providing of fuel without interruption; the use of best possible technology in the deliverance of fuel; the need to expeditiously distribute fuel well forward and the continued pressure on logistical personnel to perform well and maintain supply discipline. This emphasis is telegraphing to the United States the Soviet Union's commitment to an ever increasing military offensive capability. ↑

TABLE OF CONTENTS

FOREWORD	11
SUMMARY	111
TABLE OF CONTENTS	1v
INTRODUCTION	1
CONCEPTS OF FUEL SUPPORT	1
STOCKPILING	3
AREAS OF EMPHASIS CONCERNING FUEL RESUPPLY	4
Uninterrupted Flow of Fuel to the User	4
Technical Improvements in the Means of Providing Fuel	6
Distributing Well Forward with Haste	9
Supply Discipline through Supervision	10
CHARACTERISTICS OF SUPPLY SYSTEM	12
CHIEF OF REAR SERVICES	13
KEY LOGISTICAL OFFICERS IN BATTALION SIZE UNITS	16
STUDY OF FUEL SUPPORT OF SUB-UNITS IN COMBAT	19
March	19
Offensive	22
Defense	25
CONCLUSIONS	26
FOOTNOTES	29
BIBLIOGRAPHY	33

INTRODUCTION

There is a popular theory that the Soviet military is capable of fighting a short duration war but could not adequately supply their tank and motorized rifle units in a protracted war.¹ Though this paper does not discuss in particular Soviet capabilities of fighting either a short duration war or a protracted war, it does underline that the capabilities to supply fuel (fuels and lubricants in this paper will be designated as fuel) for units are an important yardstick. When considering that fuel is the life line of even the most formidable combat equipment, a particular approach to the problem of fuel resupply will give an indication whether the current Soviet doctrine is headed in an offensive or defensive direction.

This study concentrates on a general analysis of Soviet fuel supply concepts and a specific analysis of practical exercises under battle field conditions whereby sub-units of battalion size units are supplied fuel on the march, during the offensive and in the defense. It is important to note that the Soviets continue to believe in the importance of lessons learned during the Second World War.

CONCEPTS OF FUEL SUPPORT

The major contribution to both industrial might and military might is fuel. Soviet military strategy has always emphasized the close relationship between the economics of a country and its ability to wage

war. "Nothing depends more on the economic conditions of a country than its army... The organization, structure, tactics and strategy of the military depends first of all at any given moment on the degree of achievement of production..."² Lenin also emphasized in his writings the need for the new Soviet nation to build a strong industrial base.

Sokolovsky, in his well known book, Soviet Military Strategy, realizes the growing importance of fuel on the modern battlefield, "... one notes a trend toward more rapid increase in requirements for fuels and lubricants..."³ He predicts that the Soviet logistician will become more involved in the supplying of fuels than ammunition. "On the whole, fuels and lubricants may account for more than 50 per cent of the total weight of material required by the armed forces."⁴ Sokolovsky continues, "While during the Great Patriotic War the weight of ammunition was about two-thirds that of fuel and lubricants, today, 1968, (emphasis added) according to rough calculation, it will scarcely exceed one-half."⁵

In his recent book, Military Cooperation of Fraternal Peoples and Armies, former Warsaw Pact commander Yakubovsky (July 1967 - November 1976) stated that the Warsaw Pact has the advantage of more fuel potential over NATO. "High self provision of strategic types of fuel,... within the fraternal countries is noted as a strength of their united power and is an important advantage in comparison with countries of the imperialist block NATO."⁶ This production potential can be verified by many western sources. It is generally accepted that the Soviet Union is invulnerable to the "oil weapon" and will continue to be self-sufficient

in this area barring any unforeseen reverse in its development.⁷

It would seem that the current emphasis placed on fuel resupply is a result of the Soviet military's determination to be prepared. On a strategic level, the emphasis is on stockpiling the necessary war materials to give them the capability to immediately wage war. At the tactical level, the emphasis is varied but the following seem to have some priority: Uninterrupted flow of fuel to the user; technical improvement of the means of providing fuel; distributing fuel well forward with speed and maintaining supply discipline with well trained supervisors.

STOCKPILING

Stockpiling provides the basis for a potential immediate switch to combat operations. Soviets argue that all preparations must be accomplished in peace time. The Soviet stockpile reserves are divided into categories according to their intended use. They are designated as emergency reserves, mobilization reserves, strategic reserves and state reserves. Emergency reserves are designated to be used for the immediate conduct of military operations for a specified period of time. Mobilization stocks are used to replace expenditure and losses during the initial stages of the war operations. The strategic material reserves are that part of the state reserve which is placed under the control of the General Staff. All remaining stocks constitute state reserves.⁸

Assuming that the fuels are being stored properly, the stockpiling

of fuels by the Soviets should give them a variety of military options in the event of war.⁹ These reserves could be used for the immediate defense of the Soviet Union and its allies. However, the United States military is concerned that they have been designed for a possible unexpected strike against an enemy. An evaluation of the stockpiling of fuel is of particular importance since its type, location and quantity might give us a clue to its planned use. Such observations, however, are only possible when the storage is built above ground. Sites below the surface, unless observed during construction, are subject mostly to guess work pertaining to type of fuel and quantity. Level of storage is another area that is impossible to determine without firsthand knowledge.

Stockpiling is dependent upon natural resources and production capabilities. Within the Soviet Union both are controlled by the state. Therefore, it can be assumed that the state has the authority to immediately utilize all necessary fuel resources in the event of war. "The entire country with its social political structure, human and material resources, industry, agriculture, transportation networks, science and culture participates in the economic support of our armed forces in combat operations."¹⁰

AREAS OF EMPHASIS CONCERNING FUEL RESUPPLY

Uninterrupted Flow of Fuel to the User

The uninterrupted flow of fuel to the user in combat is obviously the major task of tactical resupply units. This principle is consistently

and emphatically stated in almost every article written concerning military fuel resupply. The Soviets have even assigned a specified cruising range for each vehicle which must be maintained by a designated number of refueling units.¹¹

The refueling units within a battalion size element are made available by additional cans and canisters on the vehicles, by indigenous fuel tankers and by stationary refueling points. "Intact fuel" is part of that fuel which is stored in cans and canisters of each vehicle. This fuel can only be expended in critical situations with the permission of the regimental commander. If this supply is below its refueling unit, the fuel must be replenished without delay. Indigenous fuel tankers and stationary refueling points provide "expendable" fuel for training and normal combat operations.¹²

Uninterrupted flow of fuel during combat exercises has been found by the Soviets to be best maintained by "intact fuel" rather than "expendable" as is exemplified in this quote:

"It is most expedient to carry additional fuel stores directly on the combat vehicles. This eliminates the dependence of tank combat readiness on the timely arrival of group refueling facilities and transport vehicles with fuel reserves. In addition, as shown by experience, in this case, the time required to refuel the tanks is significantly reduced. In one exercise, about 25-30 minutes were required to refuel vehicles of a tank battalion from 200 liter barrels installed two to a tank, while during this same time a tanker was able to refuel only four tanks."¹³

Soviet sources, if taken literally, signify that they have almost

achieved constant fuel resupply. However, an overemphasis of this task tends to indicate a serious weakness which the Soviets are trying to solve by bringing it to the attention of their military commanders.

Technical Improvements in the Means of Providing Fuel

The Soviets are generally conservative in their military technology, however, the new tactical pipe laying vehicle, with its modern pipe laying methods, refutes their usually conservative nature. The concept of modernization of refueling methods is supported in Soviet writings. "The modern refueling of military equipment constitutes one of the most important conditions for maintaining the fighting efficiency of the forces."¹⁴

The tactical pipe laying vehicle first appeared in the open Soviet press (Red Star) in June of 1973. It was described as the "blood machine" which gives a clear indication of its importance in providing the life giving substance (fuel) to the Soviet military machine.¹⁵ Though it is common knowledge that there continue to be technical problems involved in the operation of the pipe line, such as pump engine breakdowns, pipe bursts, blockages in the pipes and adjusting to steep gradients; the advantage of guaranteeing 20,000 gallons of fuel per hour over reasonable distances on the battlefield is decisive. It is estimated that a battalion of 3 companies equipped with the pipe laying machine could lay up to 25 kilometers of pipe line per day over favorable terrain.¹⁶

This machine attempts to solve the fuel requirements on the modern

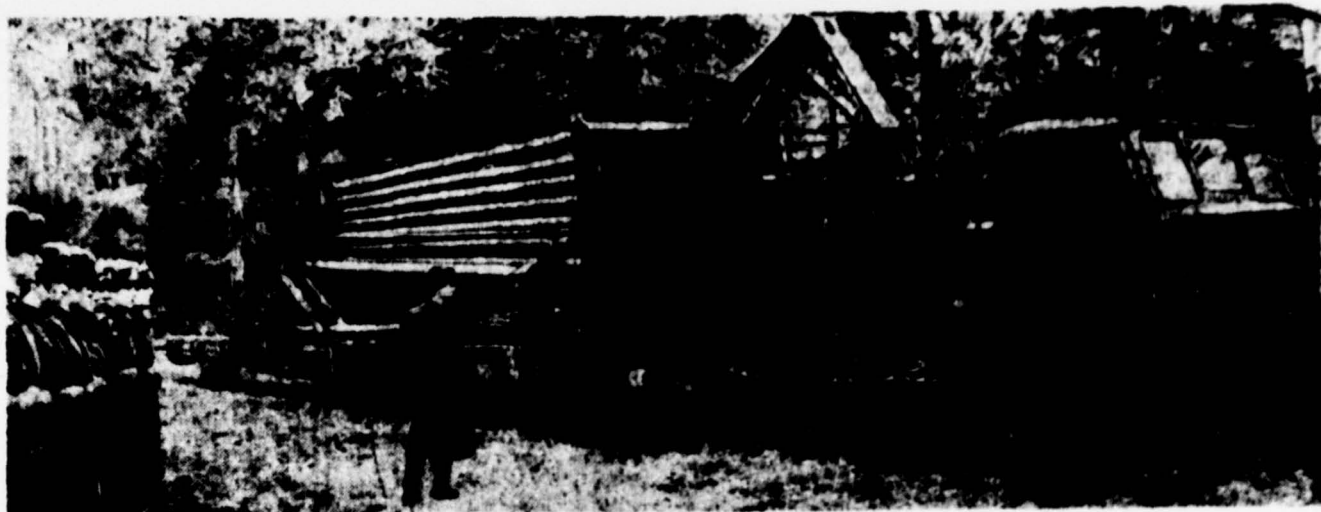
battlefield without further congesting the road net work in the rear. As late as October 1976, Red Star, displayed a newer version of the vehicle that is capable of better cross country movement. (See page 8.)

Although the Soviets emphasize in their military writings the use of advanced technical means to supply fuel, few examples are publicized. Of these exceptions, the pipe laying machine is featured frequently as the primary achievement in tactical fuel supply technology. This type of detailed reporting is contrary to their normal publications as shown in the following quote. "It suffices to say that in 1974 the service received technical facilities several times greater than in 1969. There was also a considerable increase in the delivery of automotive fueling means and transportation. Many of the technical facilities are complex, highly effective and answer the strictest of contemporary requirements."¹⁷

It is interesting to note that in the book, Rear Support of Sub-Units in Combat, the author does become specific when evaluating the different methods available for refueling vehicles.¹⁸ Mechanized refueling was considered the most advantageous. The use of manual pumps was considered next in importance. Lastly, the author writes about even the use of buckets and funnels.

Other writings emphasize only that the fuel supply service is acquiring a more modern and sophisticated function in the engineering service. They report that 90% of the fuel supply service officers currently have a higher or middle education.¹⁹ One might question if such highly educated officers are needed to supervise the use of buckets and

NEW PIPE LAYER VEHICLE



23 Oct 1976 Red Star

Using this vehicle it is estimated that a battalion could lay up
to 25 KM of pipeline per day over favorable terrain.

funnels.

Distributing Well Forward with Haste

This principle emphasizes the desirability for higher units to provide fuel to lower units by use of organic transportation. There is also a desire to provide fuel close to the forward edge of the battlefield in a timely manner. Time, of course, plays a major role. "The principle requirement at all times is that of reducing to the maximum possible degree the amount of time required to carry out these complicated and laborious operations."²⁰

Besides the organizational tasking of units to accomplish this goal, new tankers are being built with an improved capability to stay up with the combat units in difficult terrain.²¹ To assist in speeding up the delivery of fuel, great emphasis has been placed on simultaneously providing fuel to as many as 4 tanks. Some articles go into great detail discussing the size of hoses, capacity of pumps and layout of vehicles needed to accomplish this. This involves considerable coordination and planning and is recognized to be the most desirable solution. However, it is also written that usually only one vehicle can be refueled at a time.²² No explanation is given for this contradiction.

Importance is attached to maneuvering of the refueling equipment and to ensuring that it is concentrated in those areas where a requirement may develop for the rapid refueling of equipment. There must also be an efficient use of all available technical equipment.²³

Fuel from higher units (e.g. regiment to battalion size units),

when necessary and feasible, will be delivered directly into the combat vehicles of the battalion, therefore, allowing the battalion to maintain its reserves for emergencies. This principle is illustrated during a march exercise when a refueling point is set up to assist the refueling of the battalion vehicles:

"In addition to the possibility of accelerating the refueling of the equipment following the first run, this proposal was also directed towards achieving still another goal - conserving the supplies of fuel in a large portion of the military transport vehicles following in the unit and sub-unit columns, for their use following the next day's run."²⁴

Supply Discipline through Supervision

The Soviet soldier is constantly reminded of his responsibility and duty to achieve the most from his supply resources. Concerning fuel in particular, percentage figures are given to indicate which is the best possible method of refueling vehicles without waste. Mechanized refueling is considered the quickest method of refueling. It also incurs the smallest loss of fuel - 0.06%. With the use of manual pumps, the loss increases to 0.1%, and the least reliable method is with buckets and funnels - 1% loss.²⁵ These figures show an awareness of the most desirable means of refueling and emphasize conservation and efficiency.

To control the actual amounts of fuel designated for a battalion size unit, norms for fuel are given by the regimental commander. Troops cannot use up material in unlimited amounts, but they must understand these norms and be strictly limited by them.²⁶ No actual figures are given for the limits from which one might draw some comparative

conclusions.

During an exercise because of a break in a tactical fuel line, heavy losses of fuel were noted. The Soviet solution to this problem was to insure better supervision of the pipe laying personnel. The complete supervisory responsibility of Soviet officers can be viewed in the following quote:

"The deputy company commander for technical matters, who is at the pipe loading point, supervises the hauling of pipes and equipment to the route, the work of the loading team, and keeps track of the pipes hauled to each installation sector and, if necessary maneuvers the pipe carrying trucks. When all pipes have been taken out to the route, he supervises the work of the motormen in readying the pumping stations for operation."²⁷

Junior officers insure that fuel equipment is operating properly and are responsible for the training of their men in their duties. As noted, during an exercise officers will be directly involved in almost every aspect of fuel resupply. This demonstrates the importance placed on refueling properly and also explains how the Soviets utilize their junior officers.

The Soviets demand conservation of fuel through strict vehicular management. For example, vehicles are not to be idled for long periods of time. Good driving habits, which reduce consumption of fuel, are enforced; and utilization of the proper vehicle per requirements is insisted upon. To alleviate the problem of fuel consumption in the mountains which increases by 20% or more on the average, "a special altitude carburetor adjustment is performed which consists of decreasing

the amount of fuel which is supplied through the main metering devices of the carburetors."²⁸

The Soviet military is aware of the limits on fuel and the necessity to utilize their resources with care. Because the Soviet military is aware of the distribution problems in the civilian economy, they continue improving the military supply distribution and capability.

CHARACTERISTICS OF SUPPLY SYSTEM

The Soviet military system of supplying fuel relies mainly on three modes of transportation: railroads, wheeled vehicles and pipelines. Air transport plays such an insignificant role in fuel resupply that it will not be discussed here.

The Soviets are obviously aware of a historical Russian military weakness - transport. Yakubovsky writes, "One of the most important military-economic potentials of socialist coalition is transport."²⁹ Here he is writing about the need for the Warsaw Pact countries to unite their effort in solving the serious transportation problems among socialist states. Within the Soviet military itself, transport has been given a high priority which is evident by the modern production in this field.

Railroads have the mission, during war time, of delivering fuel in tanker cars from the production and refining centers down to storage areas located in the rear of each military front.³⁰ From these storage areas, the Soviets have the option of moving the fuel forward to the user by either of two methods. Motor transport presently is the most

widely used method. The URAL 375 truck with an assortment of heavy tank trailers is the backbone for this means. The vehicle has been evaluated by western experts and found very capable of performing its mission. (See page 14.)

Secondly, the tactical pipe lines are used for moving fuel between the front and tactical armies. There is thought to be a regiment size tactical pipe laying unit at each front. This unit should greatly reduce the fuel moving requirements of the transportation regiment at front. Though the tactical pipe laying system has not been perfected, the amounts of fuel which it could provide, considering the amount of equipment involved and time needed for its operation, is impressive.³¹

When considering these three methods of transportation, Soviet writings give a growing importance to the potential of tactical pipelines. Although truck transport continues to be the most widely used method of fuel distribution, the Soviets are searching for newer and better ways of utilizing tactical pipelines.

CHIEF OF REAR SERVICES

A Chief of Rear Services coordinates most logistical activities in the Soviet Army. This position is found from the ministry of defense level down to the regiment. The Chief of Rear Services is responsible at each level of command to his immediate commander and to the Chief of the Rear at the next higher command level. He does not handle all logistical requirements. For example, ammunition supply is co-ordinated

URAL 375



"The Soviet Army's standard cargo carrier is the URAL-375. It is equipped with locking differentials, power steering and brakes, can-controlled central tire inflation systems, and wide profile tires."³² The last two factors allow the driver to change tire pressures according to the driving surface. The area of the tire print can be doubled by deflating. This capability, along with the 300 mile cruising range of the truck, indicates that this vehicle can keep pace with the highly mobile combat units they support.

through artillery channels.³³

Supply requirements are set for a unit by the next higher command that take into consideration both the needs and norms set for that unit.³⁴ This concentration of the planning process at higher levels indicates a possible loss of flexibility to react immediately to the changing requirements taking place on the battlefield. On the other hand, the "delivery forward" principle by which lower headquarters are supplied and serviced directly by the logistical assets of higher headquarters reduces the need for large amounts of logistical support in lower level combat units. This increases their mobility and flexibility to respond to a given situation.³⁵

The present Chief of the Rear of the Soviet Armed Forces, and Deputy Minister of Defense since 1972, is Army General Semen Konstantinovich Kurkotkin. Kurkotkin was formerly commander-in-chief of the 20-division Group of Soviet Forces Germany. During the Second World War, he commanded a tank battalion and later a tank brigade.³⁶ This combat tank background for a logistical chief is indicative of the experience and high qualities required for a position which demands familiarity and responsiveness to the logistical needs of the present tank heavy Soviet Forces.

At a rear service exhibit in 1975, General S. K. Kurkotkin set the tasks for the new training year. In general he mentioned the need to improve the overall effectiveness of the Rear Services, but he more importantly stressed further reducing the time required for refueling combat vehicles.³⁷ This continued emphasis on the reduction of time while

providing fuel is very significant to the Soviet military.

KEY LOGISTICAL OFFICERS IN BATTALION SIZE UNITS

Understanding the duties and responsibilities of key logistical officers in a Soviet battalion will give insight into the operating factors of fuel resupply. Though all aspects are not clear, there is enough written which explains positions in this chain of responsibility. There are four key logistical officers in a battalion who seem to have a considerable influence on whether or not the fuel resupply system operates properly; battalion commander, chief of staff, deputy battalion commander in charge of supplies and maintenance and the supply platoon leader.

The Soviet battalion commander, like his American counterpart, is responsible for everything which does or doesn't happen in his unit. Concerning fuel, it is emphasized that he must know the availability and conditions of fuel in his unit and insure that subordinate elements are fully supplied in a timely manner.³⁸ Though higher headquarters determine mass refueling procedures for the battalion vehicles, the battalion commander insures that a timely and orderly replenishment of fuel to his vehicles is accomplished. He might become involved also in the actual preparation of the vehicles, organization of the meeting area and designation of the order in which the vehicles should be replenished.³⁹

Though the battalion commander generally delegates routine decisions on supply matters to logistic personnel, during the offensive, he directly

supervises this activity. At this time, he personally becomes involved in determining number of vehicles to be refueled, refueling volume, refueling sequence, use of organic or attached means of refueling, setting of deadlines and evaluating his own battalions' capabilities.⁴⁰ The battalion commander is also expected to constantly check the completeness of issue and quality of fuel.

The chief of staff of the Soviet battalion assists the battalion commander in the fuel supply field through organizing the rear support. He also must know the availability and state of fuel in the battalion.⁴¹ He must understand capabilities of organic rear units; give proposals to the battalion commander concerning the best organization of rear support and insure that all instructions pertaining to support that are issued by the battalion commander are carried out. He assists the supply platoon leader in his duties and has the authority to coordinate directly with the company commanders by giving explicit details concerning fuel resupply procedures. In addition, the chief of staff maintains liaison with the command post and rear command post of the regiment.⁴²

The duties of the deputy battalion commander in charge of supplies and maintenance (DBC) are comparable to the combined responsibilities of the S-4 and maintenance officer of an American mechanized battalion. On the one hand, he is responsible for the timely organizing of supply within the battalion, while on the other hand, he personally directs the work connected with the servicing of the vehicles to include the supply of fuel. He is required to know the availability of fuel in the battalion

thoroughly. He reports this information to the battalion commander while keeping the chief of staff informed and coordinates with the next higher level.⁴³

The D3C has the additional duties to requisition for fuel, to organize the reception and issue of fuel to sub-units and to instruct the chief of the battalion resupply point on the order and deadlines for the delivery of fuel. He receives his direction from the battalion commander via the chief of staff and guides the supply leader in his duties.⁴⁴

The supply platoon leader, in the case of fuel, receives his instructions from the deputy battalion commander in charge of supplies and maintenance. He is responsible for the storage and preservation, transportation and, most important, the setting up and actual operation of the battalion resupply point. He reports through the chief of staff to the battalion commander on the stockage of fuel.⁴⁵

For executing its missions, the supply platoon is divided into two squads. The motor vehicle squad consists of the drivers and vehicles used for the transporting of fuel and ammunition. It receives, stores and transports fuel for the battalion. It delivers fuel directly to the combat vehicles of the sub-units. The administrative squad maintains the records of all transactions pertaining to supply.⁴⁶

For combat, the battalion commander normally would organize the supply platoon into two rear tactical elements: the battalion ammunition supply point, and the battalion refueling point. The supply platoon leader personally controls the ammunition supply point and the squad

leader of the motor vehicle squad has the responsibility for the battalion refueling point.⁴⁷

Besides the four key logistical personnel already mentioned, others also play important roles in maintaining the continuous flow of fuel in the Soviet battalion. The duties of the company commander concerning fuel mirror those of the battalion commander. The deputy company commander's responsibility would be like that of the deputy battalion commander in charge of supplies and maintenance. The company first sergeant receives, inspects and rations his unit's fuel allocation, much as the supply leader does at battalion level. The last link, and most definitely an important one in the fuel chain, is the squad leader. He must know when the vehicle fuel stocks need to be replenished.

STUDY OF FUEL SUPPORT OF SUB-UNITS IN COMBAT

According to Soviet writings, the rear support must be continuous, flexible and organized according to the combat mission. Realizing, however, the ever changing mode of war, the senior chief provides instructions which should take into consideration the concrete situation. By analyzing the methods of supplying fuel during a march, offense or defense, one should be able to draw some conclusions about Soviet capabilities and consider their areas of emphasis.

March

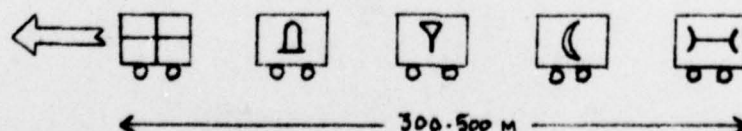
"A march is the organized movement of tank and motorized rifle units, conducted along an indicated route in march columns under their own

power."⁴⁸ When the decision to move is given, the battalion begins to prepare by loading reserve fuels up to the norm on the vehicles. If necessary, additional fuel is provided. The organizing of the rear is accomplished by the deputy battalion commander in charge of supplies and maintenance from the direct instructions of the battalion commander. Fuel trucks and refueling means may be assigned to the battalion throughout the entire march depending on the distances involved and the type of combat expected. It is absolutely imperative that all vehicles are topped off just prior to combat operations and are able to sustain operations for one full combat day. Soviets explain:

"When tank units execute a march under combat conditions, it is important not only to provide all vehicles with fuel for use on the march, but also to see that the fuel is sufficient so that they complete the march in full readiness for combat."⁴⁹

The correct disposition and movement of the rear during the march is important in understanding how the Soviets perceive the fast and efficient use of forces, flexible maneuver and close collaboration. When enemy contact is likely, the configuration of the battalion rear shows the medical assets first, ammunition second, fuel third, provisions fourth with the last element being the repair workshop as shown in figure

1.⁵⁰



This seems to be the most logical use of the forces available. If combat commenced, the most needed supplies would be immediately forward and available. Fuel would not be the primary consideration once combat began. Evacuating the casualties and supplying the troops with adequate ammunition would have top priority under such conditions.

Fuel would have a higher priority during a march when there is no danger of enemy contact. During this type of a march, the fuel vehicles would be placed forward. Additional barrels, cans and cannisters of fuel would be mounted on and in the vehicles, thus insuring sufficient fuel for the march. In addition, this would reduce march refueling time, increase self-sufficiency and therefore, improve combat readiness.⁵¹

It is stated that the battalion rear has complete mobility for the march under all conditions. Refueling during a march without anticipated enemy contact would also be completed during halts and daytime rest periods. Soviets teach and practice that:

"Short halts lasting up to 30 minutes are usually called every 2-3 hours of march. During the halts, tanks and other vehicles are inspected (when necessary, fuel and lubricants are replaced)..."⁵²

Soviets once again emphasize that it is best that fuel vehicles from higher headquarters provide fuel during these rest periods, thus insuring the conservation of their own organic fuel resupply means for later, more critical, immediate use. "During the last halt, all battalion vehicles are usually refueled."⁵³

When conditions allow during the march, a battalion refueling point

would be set up at a designated forward area. There, controlled by the squad leader of the motor vehicle squad, an area would be chosen which could simultaneously provide fuel to several vehicles. Emphasis is placed on the use of side roads; sufficient room to maneuver the vehicles for quick refueling and plenty of camouflage (forest).

Soviet writings indicate that in actuality it is only during the march that simultaneous refueling of two vehicles would take place. Under most other conditions, a fuel tanker would be able to refuel only one vehicle at a time.⁵⁴ It is this situation that the Soviets are trying to improve. Soviets feel that 60% of refueling time is lost in moving about while refueling.⁵⁵

Offensive

"Offensive action is the main type of combat for tank and motorized rifle forces."⁵⁶

The configuration of the battalion rear during an offensive would be the same as during the march, with the battalion aid station forward, ammunition next, followed by fuel. This would be the normal planning configuration, although actual vehicle order will depend on the combat mission, number of vehicles to be refueled, availability of refueling vehicles and conditions. In other words, these variables might change the configuration.

Before offensive combat operations, the Soviets emphasize the absolute requirement that all vehicles, including those of the battalion reserves, are replenished prior to reaching the deployment line. "In all

circumstances, at the beginning of the attack, the available fuel in the combat vehicles must ensure the execution of the battalion combat mission over its entire depth (for one combat day).⁵⁷ Another source states: "In all cases, the motor vehicles must start the battle with completely full interior and some exterior fuel reserves."⁵⁸

To accomplish this priority, a mixed method of refueling is recommended. This means that some vehicles would use the barrels, canisters and cans carried on the vehicles to resupply themselves. The empty containers would be left behind to be collected and transported by personnel and facilities of the senior command. Other vehicles would be refueled from tankers from higher headquarters. In this circumstance, vehicles from the battalion would be refueled directly in the company combat formations in hidden areas or in exceptional cases when the vehicles go to the refueling trucks.

During all variants, the assigned refueling vehicles from higher headquarters are used first; thus leaving the battalion organic refueling capability ready to supply other battalion vehicles with fuel during combat. During the time individual vehicles are in repair or are in reserve, they will be refueled. This would be accomplished with the assistance of rear echelon troops.⁵⁹

In the offensive, the supplying of combat vehicles would occur during during short halts. The battalion rear would move forward in a leapfrog manner, 50-100m behind the combat formations. Each time the battalion would deploy, the rear would move up again and take positions and be ready

to resupply as needed.

The Soviets write that positions would change rapidly during the offensive and that precise coordination, especially at night, with respect to time and location of refueling is important. This is clearly described in the following:

"Along the movement routes and on the approaches to the refueling regions, placards were erected indicating that the refueling points were near at hand. Markers indicating that types of fuel were set up directly in the refueling region and at the beginning of each prescribed unit assembly area. In preparation for the approach of the columns, the motor vehicles at the disposal of the rear area supervisors of the units made regular runs over the newly fallen snow, thus creating tracks leading to each refueling point."⁶⁰

This emphasis on coordination is also brought out in the training goals. A driver must know how to use a compass, read road signs, identify local land marks and in addition, know the process of rapidly unloading his cargo. Guides would be used to insure that the fueling vehicles from higher reach the correct location within the battalion.⁶¹

Ideally, vehicles in the offensive would be refueled as close as possible to combat formations at night or during periods of limited visibility. This would take place along roads in camouflaged areas, yet there would be enough space to allow maneuverability. According to Soviet writings, refueling usually takes place at the end of the day. The rotation of units for refueling is not mentioned.⁶²

Refueling of the Soviet battalion during the offensive represents a leap frog system whereby the refueling capability follows the combat

capability. Soviet writings indicate an awareness of the complications and confusions which occur during combat and demand the highest standards in the area of fuel resupply. However, demanding and receiving concrete results and improvements are not one and the same thing. Considering the large masses of combat vehicles needed for offensive action, fuel supply will be difficult. Large concentrations of vehicles at fuel resupply points will be subject to targeting by the enemy. Concealment areas large enough to be effective for refueling purposes are obvious and subject to air surveillance. The discussed refueling procedures seem to be the only present method technologically possible, yet Soviet writings would make one believe that something special has been discovered. Emphasis on insuring constant uninterrupted flow of fuel to combat vehicles during the offensive is obvious, but innovative methods of accomplishing it are not.

Defense

During defense, the battalion rear would be located at a greater distance behind the combat formations. If a breakthrough occurred, or if there was a danger of encirclement by enemy forces, this would allow greater maneuverability and reaction time. If the battalion was in a defensive posture and preparing for offensive action, the logistical assets to include fuel would be located in the center of the battalion, near a road and ready to move forward.

Fuel for the battalion during defense is increased and is on the ground at the battalion resupply point. Greater amounts of fuel are

maintained during defense to allow a changeover to the offense without the delay of providing additional fuel. Additional fuel containers are to be maintained on the vehicles at all times. In defense, the battalion combat vehicles would be refueled directly in combat formations, in the pauses between the battles and usually at night. The companies themselves might have additional ammunition and fuel stored within their areas.⁶³

Again, this reemphasizes their preoccupation with always maintaining a reserve of fuel for improved combat readiness. In comparison to the march and offensive action, very little is written about refueling during defense. Also, defense does not play as significant a role as offensive action in training exercises.

CONCLUSION •

This study has attempted to focus on the Soviet concept of fuel resupply. However, it must be understood that the approach was largely characterized and limited by source material. Western sources that might give an insight into particular areas of Soviet fuel resupply are almost nonexistent. Soviet writings on this subject are limited to a few field exercise books which refer to technical assistance to units, to include fuel, and various articles in the Soviet Rear Services Journal, Tyl i Snabzhenie.

One finds throughout all the Soviet writings concerning fuel resupply constant emphasis on insuring that combat units receive their

necessary fuel to perform assigned missions and that they receive it in the fastest means possible. Remembering the problems that the Soviet Army encountered during the Second World War concerning fuel supply, today, the Soviets are emphasizing the most modern methods available for providing fuel. The tactical pipe laying battalions equipped with the modern pipe laying machine; the emphasis on refueling several vehicles simultaneously and the special stress on supervisory responsibility of junior rear service officers are all good examples of this awareness.

Time also plays an important role in Soviet writings concerning the providing of fuel. Attention is drawn to the severe losses incurred during the Great Patriotic War. During this period, there were many instances when units did not receive fuel on time. Also, the process of refueling took so much of their time that they were not properly prepared for combat. Soviet soldiers are constantly reminded that what happened during the previous war will never happen again.

Besides the resupplying of vehicles with fuel, the Soviets have also stressed the need for combat vehicles or units to be self sufficient concerning fuel. This has been partly accomplished by maintaining on the combat vehicles considerable fuel in containers and by establishing certain portions of fuel to be used only in emergency conditions. The procedure of supplying combat vehicles from higher rear units assists also, in maintaining sufficient reserves of fuel in lower combat units which can be utilized immediately.

There is presently an increasing interest in the Soviets' continued

modernization of the armed forces. In the area of fuel resupply, this modernization is also continuing; and the stress on it is consistent with the need to support a fast moving offensive which the Soviets presently are teaching and practicing.

FOOTNOTES

1. Graham Turbiville, "Soviet Logistic Support for Ground Operations," Journal of the Royal United Services Institute for Defense Studies, September 1975, p. 63.
2. I. I. Yakubovskii, Boevoe Sodruzhestvo Bratskikh Narodov i Armii, (Military Cooperation of Fraternal Peoples and Armies), (Moskva: Voenizdat 1975), p. 219.
3. V. D. Sokolovskii, Voennaia Strategia, (Soviet Military Strategy), (Moskva: Voennoe Izdatel'stvo Ministerstva Oborony, SSSR, 1968). p. 379.
4. Ibid., p. 379.
5. Ibid., p. 379.
6. I. I. Yakubovskii, p. 222.
7. Jeremy Russel, "Energy Considerations in Comecon Policies," The World Today, February 1976.
8. V. D. Sokolovskii, pp. 440-441.
9. D. Peregodov, "Ekonomim Goriuchee," (We are Saving Fuel), Tyl i Snabzhenie Sovetskikh Vorrzhennykh Sil, No. 12. December 1975, pp. 54-55.
10. I. I. Kushch, I. V. Gribov, I. G. Kamyshanov, Tylovoe Obespechenie Podrazdelenii v Boiu, (Rear Supply of Sub-units in Battle), (Moskva: Voennoe Izdatel'stvo Ministerstva Oborony, SSSR, 1973). p. 3. A great deal of this paper pertains to observations and evaluations of the material presented in this book. This book lays out in detail the Soviet procedures and responsibilities pertaining to fuel re-supply.
11. Ibid., p. 63.
12. Ibid., p. 60.
13. V. D. Zelenskii, A. A. Chistov, G. S. Chulkov, Tekhnicheskoe Obespechenie Tankovykh i Motostrelkovykh Podrazdelenii v Sovremennom Boiu, (Moskva: Voennoe Izdatel'stvo Ministerstva Oborony SSSR, 1972), p. 107. Chapter II explains in detail fuel resupply procedures and duties of battalion technical supply officer.

14. Engineer Colonel V. Korolev, "Sokrashehaem Sroki Zapravki Boevoe Tekhniki v Pole," (We are Reducing the Time Required to Refuel Combat Equipment in the Field), Tyl i Snabzhenie Sovetskikh Vooruzhennykh Sil, No. 8, 1974, p. 71.
15. "Na Trasse Truboprovoda," (The Route of the Pipeline), Krasnaia Zvezda, June 29, 1973, p. 1. First article to appear in Soviet press concerning the development of the new pipe laying vehicle.
16. C. N. Donnelly, "Soviet Tactical Pipelines," Journal of the Royal United Services Institute for Defense Studies, June 1974, p. 58.
17. "Zabotias v Besspereboinom Obespechenii Voisk Goriuchim," (Concerned with Continuously Supplying the Troops with Fuel), Tyl i Snabzhenie Sovetskikh Vooruzhennykh Sil, No. 1. 1975, p. 68.
18. I. I. Kushch, I. V. Gribov, I. G. Kamyshanov, p. 69.
19. "Zabotias o Besspereboinom Obespechenii Voisk Goriuchim," p. 68.
20. Engineer Colonel V. Korolev, p. 71.
21. John Erickson, "Soviet Ground Forces and the Conventional Mode of Operation," Journal of the Royal United Services Institute for Defense Studies, June 1976, p. 47.
22. I. I. Kushch, I. V. Gribov, I. G. Kamyshanov, p. 85.
23. Engineer Colonel V. Korolev, p. 71.
24. Ibid., p. 75.
25. I. I. Kushch, I. V. Gribov, I. G. Kamyshanov, p. 87.
26. Ibid., p. 58.
27. Colonel Tech Svc. M. Kabanov, Lt. Col-Engineer Iu. Turichev, "Taktiko-Spetsial'noe Uchenie s Lineinoy Rotoy po Razvertyvaniyu Truboprovoda," (A Tactical Special Exercise with a Line Company on Setting up a Pipeline), Tyl i Snabzhenie Sovetskikh Vooruzhennykh Sil, No. 6. June 1975, p. 34.
28. Engineer Major Razkov, "Razvertyvaniyu Truboprovoda v Gorakh," (Deployment of Pipe in the Mountains), Tyl i Snabzhenie Sovetskikh Vooruzhennykh Sil, No. 5, May 1971, p. 82.

29. I. I. Yakobovskii, p. 226.
30. Andris Trapans, "Logistics in Recent Soviet Military Writings," Memorandum RM-506a-PR, The Rand Corporation, August 1966, p. 22.
31. C. N. Donnelly, p. 57.
32. Cpt. William R. Hotze, Cpt. Terry L. Schott, "Soviet Logistics - How good is it?" Army Logistician, March-April 1976, p. 20.
33. Ibid., p. 18.
34. I. I. Kushch, I. V. Griбанov, I. G. Kamyshanov, p. 81.
35. Turbiville, p. 64.
36. Graham Turbiville, "Soviets Name Logistics Chief," Army Logistician, May-June 1973, p. 16.
37. "Zabotias o Bepereboinom Obespechenii Voisk Goriuchim," p. 68.
38. I. I. Kushch, I. V. Griбанov, I. G. Kamyshanov, p. 81.
39. V. D. Zelenskii, A. A. Chistov, G. S. Chulkov, p. 107.
40. I. I. Kushch, I. V. Griбанov, I. G. Kamyshanov, p. 85.
41. Ibid., p. 55.
42. Ibid., p. 69.
43. V. D. Zelenskii, A. A. Chistov, G. S. Chulkov, p. 144.
44. G. Ivanchenko, "Upravlenie Tylom Polka na Marshe," Control of the Regimental Rear on the March, Tyl i Snabzhenie Sovetskikh Vorrushennykh Sil, No. 3. March 1976, p. 27.
45. I. I. Kushch, I. V. Griбанov, I. G. Kamyshanov, pp. 15-16.
46. Ibid., p. 19.
47. Ibid., p. 11.
48. V. D. Zelenskii, A. A. Chistov, G. S. Chulkov, p. 97.
49. Ibid., p. 107.

50. I. I. Kushch, I. V. Gribanov, I. G. Kamyshanov, p. 33.
51. V. D. Zelenskii, A. A. Chistov, G. S. Chulkov, p. 101.
52. Kolomizev, "Kogda Voiska Nastupaiut v Vysokikh Tempakh," (When Forces Attack in a High Tempo), Tyl i Snabzhenie Sovetskikh Vooruzhennykh Sil, No. 3. March 1976, p. 26.
53. B. Bulgakov, B. Yegorov, "Taktiko-Stroevoe Zaniatie s Lichnym Sostavom Sklada Goriuchego," (Tactical Building Exercise with Personnel of the Fuel Depot), Tyl i Snabzhenie Sovetskikh Vooruzhennykh Sil, No. 4. April 1976, p. 39.
54. I. I. Kushch, I. V. Gribanov, I. G. Kamyshanov, p. 85.
55. Ibid., p. 85.
56. V. D. Zelenskii, A. A. Chistov, G. S. Chulkov, p. 126.
57. I. I. Kushch, I. V. Gribanov, I. G. Kamyshanov, p. 96.
58. V. D. Zelenskii, A. A. Chistov, G. S. Chulkov, p. 149.
59. Ibid., p. 149.
60. Engineer Colonel V. Korolev, p. 75.
61. Lieutenant Colonel C. Talanker. "Umelo Zapravliat' Tekhniku Goriuchim v Pole," (Skillfully Refilling vehicles with Fuel in the Field), Tyl i Snabzhenie Vooruzhennykh Sil, No. 10. October 1976, p. 79.
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63. Ibid., p. 99.

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